Improving the input of earthquake science and engineering information into decision-making: results of a workshop

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Introduction

A three-hour workshop on earthquake science-to-practice was held on 26 April 2017. The objective was to provide a forum to discuss the contribution of earthquake science and engineering to decision-making. Approximately 40 people attended, from disciplines that included earthquake science, structural engineering, engineering geology, social science, and economics, and relevant sectors such as emergency management, policy (at local, regional and central government levels), consultancies, and insurance. At the workshop, participants could learn about the complexities of the science-policy environment, discuss barriers and opportunities for input, and make suggestions for future activities.

Workshop Structure

The workshop was divided into three parts:

1. **Problem definition:** A discussion was held with the audience about what issues or problems they had encountered in getting science and engineering information into policy (Figure 1).

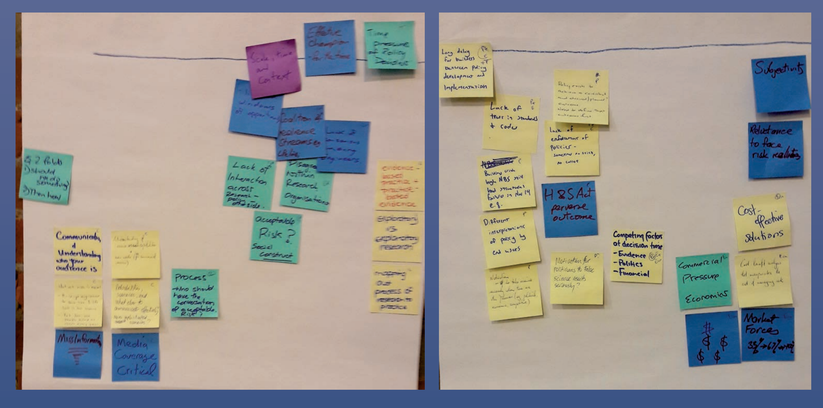

Figure 1. Problem definition exercise: Issues that were highlighted by workshop participants in applying earthquake science and engineering to practice.

2. **Panel discussion:** Three panel members presented perspectives on barriers and opportunities to incorporating science and engineering information into policy.
    - Sarah Beaven (University of Canterbury) outlined tensions that have been found to inhibit collaboration across the science policy interface, and functions that reduce these tensions;
    - Marion Schoenfeld (Environment Canterbury) spoke about the challenges of getting earthquake and engineering science into policy from a regional government perspective; and
    - David Johnston (GNS Science/Massey University) discussed the impact of social context on the science-to-practice process.

After the panel presentations, the audience formed small groups and developed questions which they then asked of the panellists.

3. **Understanding the system:** The audience worked in small groups to document a system that showed how earthquake science and engineering information might feed into policy and other decision-making. Each group was asked to choose a specific aspect to focus on (e.g. the use of engineering information for earthquake prone building policy, or earthquake science information to support land-use policy) and draw a diagram (e.g. a mind map or systems diagram) to represent how they thought the process worked (Figure 2).

Discussions during the workshop were recorded and analysed for key observations. The following describes some of the observations that were noted during the workshop.

Figure 2. Workshop participants presenting their representation of a system for conveying hazard information and ensuring accountability at the land parcel level.

Workshop Observations and Outcomes

When asked to define the problems people faced when applying earthquake science to practice **(Problem definition)** initial discussions were focussed on issues related to communication (e.g. the need for two-way conversations, reduced jargon, recognition of different "languages" spoken by different disciplines, etc.). This initial discussion of communication issues suggested an early tendency to focus on communication at the expense of unpacking some broader and more complex issues that affect earthquake science-to-practice.

As it went on, however, the workshop provided a good forum for people to think about and discuss these broader issues, particularly in the latter two activities: -

- In the **Panel discussion** session, presentations given by the panellists were followed by the development and discussion of questions focused on a range of issues that influence the science to policy environment, which many participants had previously not considered (e.g. the role of different players in the process, social factors).
- In the **Understanding the system** exercise, the participants gained an understanding of some of the key factors contributing to earthquake science-to-practice. This in turn gave a sense of the range of sectors and roles involved. Together these allowed participants to appreciate the challenges that different players face, and to think more about the ways everyone can work together across the systems involved in order to combine their specific areas of expertise.

Figure 3. Participants watching the group presentations for the Understanding the system part of the workshop.

Concluding Comments

The workshop provided a useful forum for getting people together to discuss science-to-practice issues and opportunities. It allowed participants to think more broadly about potential barriers and how they can work together better within current decision-making environments. There is considerable scope for future initiatives of this kind, which raise awareness, broaden perspectives and build relationships to support future decision-making.

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